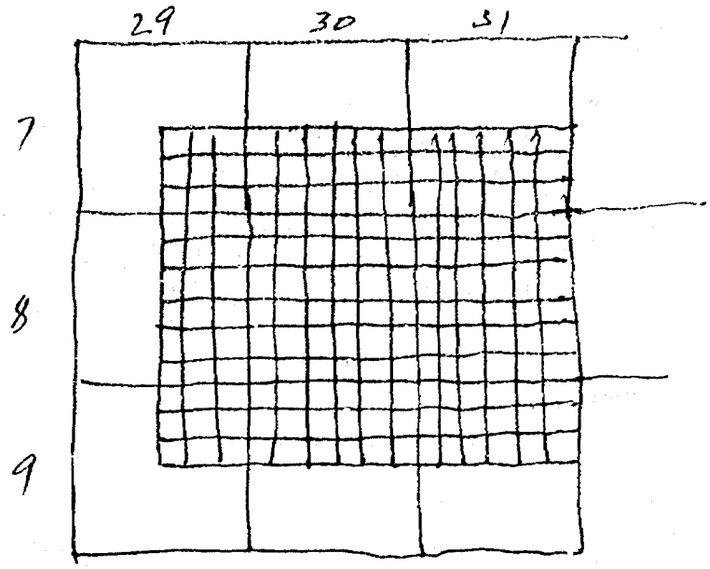
CASE NO.

7492

APPLICATION,
TRANSCRIPTS,
SMALL EXHIBITS,

ETC.

Dan Nutter



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
16 March 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Harvey E. Yates Company for a tight formation, Chaves County, New Mexico. CASE 7492

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Robert H. Strand, Esq.
FOR HARVEY E. YATES COMPANY
Petroleum Building
Roswell, New Mexico 87501

I N D E X

E X H I B I T S

MR. STAMETS: We'll call next the Case 7492.

MR. PEARCE: Application of Harvey E. Yates Company for a tight formation, Chaves County, New Mexico.

MR. STRAND: Mr. Examiner, Robert H. Strand, Attorney, from Roswell, New Mexico, appearing for the applicant, and I have two witnesses who need to be sworn.

(Witnesses sworn.)

MR. STRAND: Mr. Examiner, in this case Harvey E. Yates Company is requesting the Oil Conservation Division to enter an order recommending to the Federal Energy Regulatory Commission that an interval we will refer to as the Atoka-Morrow formation underlying certain lands in Chaves County, New Mexico, be designated a tight formation pursuant to Section 107 of the Natural Gas Policy Act of 1978, and the applicable regulations.

Mr. Examiner, in the application that was filed, the applicant requested designation of an area of 161,280 acres. Due to an error on my part in -- in preparing the application, we included approximately 23,040 acres that shouldn't have been there, and I would like to ask that that

be deleted.

And those lands are as follows: In Township 7 South, Range 31 East, Sections 22 through 27, and 34 through 36.

In Township 8 South, Range 31 East, Sections 1 through 3, Sections 10 through 15, Sections 22 through 27, and Sections 34 through 36.

And in Township 9 South, Range 31 East, Sections 1 through 3, and Sections 10 through 15.

What that acreage consists of, Mr. Examiner, is a tier of three sections from top to bottom taken off the east side of the area.

The exhibits, which we will get to here in a moment, have the correct proposed area designated on them.

MR. STAMETS: Okay. We will amend the application to delete this acreage.

MR. STRAND: Mr. Examiner, we submitted our exhibits fifteen days ahead of this hearing date as required by your regulations and the regulations of the Minerals Management Service.

We do have some additional information that's been made available to us, or come available to us, since that time which we would like to submit and I will de-

scribe that as we get to it during the testimony.

ED GROVES

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. STRAND:

Q. Please state your name.

A. Ed Groves.

Q. Mr. Groves, where do you reside and by whom are you employed and in what capacity?

A. Midland, Texas. I live in Midland, Texas. I'm employed as a Chief Geologist by Harvey E. Yates Company.

Q. Mr. Groves, have you testified before the Division in the past and are your qualifications a matter of record?

A. Yes, they are.

MR. STRAND: Mr. Examiner, is Mr. Groves considered qualified as a geologist?

MR. STAMETS: Yes.

Q. Mr. Groves, are you familiar with the application in this case, 7492?

A. Yes, I am.

Q. And have you prepared certain geological exhibits for presentation at this hearing?

A. Yes, sir.

Q. Mr. Groves, would you briefly describe each of these exhibits and their contents and their relation to the application for recommendation of the Atoka-Morrow formation?

A. Exhibit Number One is a location map which shows the boundaries of the proposed tight gas area. It also shows four cross sections that run from north to south, those being A-A', B-B', C-C', and D-D'.

All of the wells which penetrated the Atoka-Morrow section are circled and the type well is -- has a triangle on it, that well being located in Section 2 of 9 South, 29 East.

Exhibit Number Two is a contour map on the top of the Mississippian limestone. This map was made to indicate the structure of this area. We picked this formation since it is the formation immediately underlying the Atoka-Morrow. Also, it is an easy point to pick and can be defined real easily.

This shows that we are in an area of dip to the southwest with varying rates but normally about

200 to 300 feet per mile.

The Exhibit Number Three is an Isopach map of the Atoka-Morrow interval, and shows that we have a range of thickness from 91 feet in the upper northwest portion of the area to 895 feet in the xtreme southeastern portion.

This Atoka-Morrow section, this might be the best time to describe it a little bit, since we're talking about the thickness, it consists of gray to dark gray shales interbedded with fine-grained quartz sandstone with calcite cement.

Probably deposited in a shallow marine environment with same winnowing by wave action, so you're going to find varying thicknesses around structural highs.

The Morrow section, immediately underlying the Atoka, is a sequence very similar to that in lithology with the exception there are some interbedded light colored and buff colored limestones, very fine crystalline with very little porosity in them.

The Morrow sands are very similar to those that you'll see in the Atoka, being fine, very fine grained, fine grained with calcium cementing materials.

Q Mr. Groves, are both the Morrow and the Atoka formations present over the entire area that is proposed for designation?

A. The Atoka covers the entire area. The Atoka-Morrow contact is difficult to define in places; however, I believe that it might be present only in the, say, the eastern half, the Morrow present in the eastern half. The Atoka will be present over the entire area.

Q. Okay.

A. The top of the Atoka, the Atoka should be encountered at about 6600 feet in the northwestern portion and to a depth of about 9600 feet in the southeastern. So we're looking at an average depth of the Atoka over the entire area of some 8100 feet.

Q. And, Mr. Groves, the 8100 feet you refer to, that is the depth from the surface to the top --

A. To the top of the Atoka.

Q. -- of the formation?

A. Yes.

The Exhibit Number Four is an Isolith of the sands within the Atoka-Morrow section; a little bit too interpretive, I'm afraid, but it still has the information we need on it.

We have a thickness of sands in the northwestern portion ranging from 19 feet to the southeastern portion, 187 feet.

Now this is gross sands within the en-

tire interval and, as you can see, they vary very rapidly around some of the structural features that you have noticed on the other sections.

Exhibit Number Five is cross section A-A'. This runs along the western portion of the area and to my knowledge, we have all the logs within the area on the cross section with the exception of two wells in which we could not obtain logs.

Q. Mr. Groves, which two wells are those, if you remember?

A. One of them was a Stevens well in Section 1 of 9 South, 28 East. I've forgotten the designation but I believe it was the -- I don't remember the designation of the well. It was an O'Brien but I've forgotten the number.

The other one was the No. 1 Akman (sic). I'm sorry, Akman was the operator and I don't know the feet. That well is located in Section -- the northwest quarter of Section 8, 8 South, 30 East.

Section B-B' is one of the central area cross sections. I would like to call to your attention an error in the heading on the well sixth from the right. It reads to be the Texas Oil and Gas No. 1 O'Brien, Section 11, 9 South, 29 East. That is the No. 1 O'Brien "B" and it's in

Section 2.

The information at the bottom of the log is right, but we just got it wrong up there at the top.

Q. Mr. Groves, for the record, on your cross sections at the top do you show dry holes, completed wells, both gas and oil?

A. Yes. The final disposition of all wells is shown at the top. Also, I might call to your attention that the top of the Atoka is shown on all cross sections by the dotted line, so that it's easier to identify. Also, these sections are all stratigraphic. They are all hung on the top of the Atoka for an easy reference point.

MR. STAMETS: You mean the top of the Abo?

A. I'm sorry, you're right, top of the Abo.

Q. Mr. Groves, is the Morrow formation designated separately on your cross sections?

A. No, sir, it isn't. The entire interval of the Atoka and Morrow are shown as one. We have the top of the Atoka designated. We have the top of the Mississippian lime designated.

The Atoka-Morrow interval is within those two.

Q. And where the Morrow exists, that would be the base of the Morrow.

A. Yes. The Morrow will be where present in contact with the top of the Mississippian lime.

Exhibit Number Seven is section C-C'. Here you will notice that the section thickens considerably to the -- on the righthand side, and this is where we do see some Atoka -- or some Morrow beginning to be present. We also see a very rapid thickening of the Pennsylvanian above the Atoka.

And the final section is D-D', which is located along the eastern portion of the area.

Q. Mr. Groves, for the record and for identification, that is Exhibit Number Eight?

A. Yes, it is.

That's all the exhibits that I have. These sections just show the relative position of the Atoka-Morrow in the various wells in the area.

Q. Mr. Groves, is it your opinion that the proposed interval, the Atoka-Morrow formation, is at least potentially productive under the entire area proposed for designation?

A. Yes, it is.

Q. Mr. Groves, you referred to the type

log in describing your Exhibit Number One. Which well is the type log taken from?

A. The type log is taken from the No. -- or Texas Oil and Gas No. 1-B O'Brien, which was shown on cross section B-B', and wouldn't you know, it's the one we had to make the correction on, so --

Q. What is the location of that well for the record, again?

A. That is in Section 2, 9 South, 29 East.

Q. And what are the subsurface depths that you've picked as comprising the type log for the Atoka-Morrow formation?

A. All right, in that well?

Q. Yes, sir.

A. It would be 8510 to 8800.

Q. Mr. Groves, are you familiar with the fresh water aquifers which might exist under the area proposed for designation?

A. Yes. We believe that fresh water will only be found in the Triassic Sands in this area.

Q. And at what approximate depths would that be?

A. It would be from 100 to 400 feet through here.

Q. Mr. Groves, are you familiar with the rules and policies of the Oil Conservation Division and the Minerals Management Service and other Federal agencies and state agencies relating to protection of fresh water aquifers, particularly in regard to casing and cementing programs for wells which might be drilled in the area proposed for designation?

A. Yes.

Q. And do you feel compliance with these rules and regulations would adequately protect these fresh water aquifers from contamination?

A. Yes, I believe it will.

Q. Mr. Groves, did you prepare Exhibits Number One through Eight or were they prepared under your supervision?

A. Yes, they were.

MR. STRAND: Mr. Examiner, I have nothing further on direct.

MR. STAMETS: Are there any questions of this witness? He may be excused.

RAY NOKES

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. STRAND:

Q. Please state your name, place of residence, and employment.

A. My name is Ray Nokes. I live in Roswell, New Mexico, and I work for Harvey E. Yates Company in Roswell.

Q. In what capacity are you employed by Harvey E. Yates Company?

A. Reservoir engineer.

Q. Mr. Nokes, have you testified before the Division in the past?

A. Yes, sir.

Q. And are your qualifications a matter of record?

A. Yes, sir.

MR. STRAND: Mr. Examiner, is Mr. Nokes considered qualified as a reservoir engineer?

MR. STAMETS: He is.

Q. Mr. Nokes, are you familiar with the application in Case Number 7492?

A. Yes, sir.

Q. Have you prepared exhibits and materials

relating to the engineering aspects of this application?

A. Yes, sir.

Q. And, Mr. Nokes, are the majority of these exhibits, which were submitted in advance, attached together as a booklet, so to speak, as Exhibit Number Nine?

A. Yes, sir.

Q. With reference to Exhibit Number Nine, Mr. Nokes, and relating to the permeability calculations in the area, will you please describe these calculations and what data they are based on?

A. Yes, sir, I would.

Before I begin on this, I would like to apologize, due to an oversight, it's no error in calculations but as far as symbols and formulas, there was an error on page three of this report and I have typed -- had this corrected. The correction would have been encountered in the formula below the total compressabilities and also in the Darcy's radial flow equation.

I'm sorry my secretary didn't notice my "Q" in regards to a "G". She put a "G" on some and a "Q" on others, so I apologize for that, that error.

In regards to permeability calculations, the data that was used was taken from DST reports on the Texas Oil and Gas, the O'Brien B No. 1 type log well, and the

O'Brien "C" Well No. 1.

The O'Brien "B" No. 1 is located in Section 2, Township 9 South, Range 29 East, and the production test is indicated on page -- page two of Exhibit Nine, date of October the 4th, 1977. The rate was indicated at 100 Mcf and from this data taken from the DST I was able to calculate not only permeability but stabilized rate at standard conditions, and if you will notice on page three, the permeability was calculated for the O'Brien "B" No. 1 at .081 millidarcy with a radius of investigation during the DST of 23.3 foot, and this was using VanPoolen's equation.

And from this equation I was able to derive from Darcy's radial flow equation what a stabilized rate at atmospheric pressure would be at natural condisions; it would be 231 Mcf per day, which is indicated in that column.

Going back to page two again, the O'Brien "C" Well No. 1, located in Section 11, Township 9 South, Range 29 East, also a DST of July the 16th, 1977 indicated a gas production rate of 112 Mcf and there again from the data that's indicated below I was able to calculate a permeability which is indicated on page three of .0022 millidarcy with a radius of investigation during the test of 4.62 foot.

Also a calculation of flow rate to atmospheric pressure, using Darcy's radial equation, indicated a maximum rate of 19.1 Mcf.

Q. Mr. Nokes, are these the only wells that you analyzed data from for your calculations of permeability and stabilized rate of production against atmospheric pressure?

A. Based on natural completion, yes, or natural rate, I would say.

I did for a matter of record, which is Exhibit Eleven, do a calculation not on a DST but on a build-up off of the Stevens Operating Corporation's, or Stevens Oil and Gas, as it's better known, of the O'Brien "C" -- I believe that should be C-4 No. 1, another error, I apologize, that is located in Section 1, Township 9 South, Range 28 East.

This data was for my own peace of mind to determine what possibly might have been another direction to evaluate. Since I had DST's, I wanted to see what a pressure build-up using Horner plot, I also used Horner plot in the other, but it was a DST evaluation, and in this it was a 4-point multi-point back pressure test, bottom hole pressure build-up.

As you will notice on page one of Exhibit Eleven, it indicated an average rate, and there again the rates were taken throughout the 4-hour run, average for that

one test of four individual 1-hour tests, and that gives you 351.5 Mcf stimulated production.

I apologize that this did not come in. It was a matter of getting the available information, but there again, there were no DST's run on this well. There was very little information indicating a comparison of like DST to a 4-point, so there again this was a -- this was a stimulation type evaluation to give an after view of what permeability is which as you will notice, I believe it's on page two of this report, yes, on page two, showing a permeability of .0374 millidarcy. This is stimulated and stimulated permeability, a stimulated rate, and from this permeability calculation I was able to derive that even with a fractured system, a fracture manmade, induced fracture system, it did not, you know, exceed the parameters that's required by FERC.

Q. Mr. Nokes, what are those parameters for the record?

A. That it should not be greater than .1 millidarcy.

To continue on with this one report, I would like to indicate that on page three there is some history in regards to this well, indicating the perforations, the depth, and the treatment that was utilized to come up with this production.

And also, the last page, page four, is the interpretation of the Horner plot.

Q. Mr. Nokes, with regard to this particular exhibit, am I correct that the -- all of the information contained in that exhibit was not available to you at the time we submitted the prior exhibits?

A. No, sir. This was just available in just the past week that I was able to, after numerous requests.

Q. Mr. Nokes, have you also prepared an exhibit designated as Exhibit Ten?

A. Yes, sir, I have.

Q. Would you please describe that exhibit?

A. Exhibit Ten, there again, this -- the first page of Exhibit Ten is not numbered. This was a combined -- I went ahead and just added this to it, but it's a composition of a core analysis which I was able to obtain from a Midland core lab upon meeting with the supervisor down there, and was granted by Texas Oil and Gas for release, an evaluation of this core analysis by their -- their staff indicated that there was a very low productive reservoir and it would be very hard to complete a well with an economic nature.

On page three -- excuse me, that would be page four of this report you have an individual analysis

of the three foot segment that core analysis evaluated, and from this analysis I would like to point out that there is a large permeability factor that's indicated in core number three of 8724.6 to 26.

It indicated that on their initial plug, evaluation of their initial core plug, they showed a 203 millidarcy permeability . Upon conversing with the staff and with the supervisor there with CORE Lab, they indicated that this was not a good replica or view of what the matrix would be due to the fact that the core plug was a fractured plug. It was -- the permeability was indicated in the test that it was a fracture, vertical fracture, of high permeability.

Their indication, or their response to this, was that due to the 90 degree offset plug, that there again indicated what the rest of the core samples had been indicating of in the nature of less than 1 millidarcy permeability.

Q. Less than 1 millidarcy or less than .1 of a millidarcy?

A. .1, I'm sorry, less than .1 of a millidarcy permeability.

In calculating core analysis permeability, it's important to realize -- to realize that this is a permeability that's calculated to air and in a paper that

was presented through an SPE convention of December the 20th, 1971, Dr. Rex D. Thomas and Don C. Ward presented a paper on Effects of Overburden Pressure and Water Saturation on Gas Permeability of Tight Sandstone Cores.

In this paper they showed the relationship of overburden pressure and buoyancy effect on permeability, and the basics of this is shown on the first page of Exhibit Ten, which I took the three foot intervals, three one-foot intervals, excluding the large fracture, calculated permeability of .00902. This was derived from using the interpretations of the formula that is utilized in calculating net confining pressure from overburden pressure.

Basically, for the benefit of -- of formulas, is, what it does, it takes into consideration the matrix pressure minus the buoyancy of the interstitial water and then minus your reservoir pressure. This gives you an overburden pressure or a net confining pressure on the -- the pore space.

And in doing so, you come up with a point, a corrected permeability of .00902.

Q. Mr. Nokes, how many wells penetrated the Atoka-Morrow formation in the area proposed for designation to date?

A. There were 39 Atoka-Morrow penetrations.

Of this there were 17 DST's in this -- this zone, and out of these 39 wells there are only 7 at this present date, to my knowledge, that have been completed in the interval that has been described previously.

Q. Mr. Nokes, have you investigated the information from all of these wells, particularly the completed wells and those that have had DST's run on them?

A. I have looked at the DST's on all of these and evaluation from Exhibit Number Nine is of two of these in an area that is centered in the southernmost area of the -- the entire proposed tight gas formation.

Q. Mr. Nokes, would it be fair to say that the wells discussed in Exhibits Nine, Ten, and Eleven are the better wells from a productivity and a permeability standard?

A. Yes, sir, I would.

Q. As opposed to the remaining three wells that were completed?

A. Yes, sir. There again, our type log well was picked for that purpose; was to exemplify the fact that this was the well we felt would be the highest permeability in the area. As the results of the test on the O'Brien C-4 No. 1, production tests and permeability calculations, it was less than the natural permeability that was reflected on the O'Brien B-1, and also the O'Brien C-1.

Q. Mr. Nokes, considering Mr. Groves' geological testimony and your permeability analysis, is it your opinion that the Atoka-Morrow interval underlying the area proposed for designation would be expected to have an estimated in situ permeability of less than .1 millidarcy throughout the pay section?

A. Yes, sir.

Q. And, Mr. Nokes, is it also your opinion that based on your analysis of the data that you've presented, that stabilized production rate against atmospheric pressure of wells which might be completed in the Atoka-Morrow formation underlying the area proposed for designation would not exceed 388 Mcf of natural gas per day without any type of stimulation?

A. No, sir, it would not exceed.

Q. Mr. Nokes, have you made any investigation as to what liquid hydrocarbons, if any, might be expected to be produced from wells completed in the proposed designated area?

A. Yes, sir. On the DST's that -- evaluation of the DST's that were entered here, there was no hydrocarbon, nor was there hydrocarbon during the 4-point test indicated.

Q. Liquid hydrocarbon.

A. Liquid hydrocarbon, I'm sorry. Also, there again I would like to bring into the fact that Stevens Oil and Gas did have hydrocarbon production and it is indicated on page one of Exhibit Eleven as .0488 barrels per Mcf, which equated back to the stabilizied rate that was indicated on page two of Exhibit Eleven, was 37.96 Mcf, calculated out would indicate 1.82 or 1.85 barrels per stabilized rate, and that -- that is stimulated production, and it still did not exceed 5 barrels per day.

Q. Mr. Nokes, you have not had any analysis run of any actual liquids from the Stevens well or any other well, is that correct?

A. No, sir, no analysis was made and at this time they have not -- my understanding is that they had it on -- they had put the well on production but had taken it off and I do not know why, but they were having some kind of a problem with production.

There again, the gravity on the condensate for this well with Stevens was 65.5 gravity corrected, API gravity.

Q. Mr. Nokes, would that gravity liquid hydrocarbons indicate to you as a reservoir engineer that it was condensate as opposed to crude oil?

A. Yes, sir, in reservoir conditions it would

have been in a gas state.

Q. Mr. Nokes, is it your opinion then based on this analysis that wells completed in the Atoka-Morrow formation would be expected to produce less than 5 barrels a day of crude oil without any type of stimulation?

A. Yes, sir, it would be less than 5 barrels a day.

Q. Mr. Nokes, are you familiar with the rules and policies of the Oil Conservation Division and the Minerals Management Service and other Federal and State agencies relating to protection of fresh water aquifers?

A. Yes, sir.

Q. And particularly in regard to casing and cementing programs for wells which might be drilled to this proposed formation?

A. Yes, sir.

Q. Mr. Nokes, in your opinion would compliance with these rules and regulations adequately protect the fresh water aquifers testified to by Mr. Groves?

A. Yes, sir.

Q. Mr. Nokes, are you familiar with what types of treatment programs might be contemplated for wells to be drilled to the Atoka-Morrow formation?

A. The treatment as such for it to be pro-

ductive or of an economic advantage to whoever would drill in this area, they would have to acidize and fracture the system.

Q. If that was conducted in a prudent manner, in your opinion would such treatments have any adverse effect on the fresh water aquifers?

A. No, sir.

Q. Mr. Nokes, for the record, could you identify this proposed area in relation to the nearest town of any size?

A. It's approximately 23 miles northeast of Roswell, New Mexico.

Q. Mr. Nokes, in your opinion will recommendation by the Division that this area be designated as a tight formation promote conservation and prevent waste?

A. Yes, sir.

Q. Were Exhibits Nine, Ten, and Eleven prepared by you or under your supervision?

A. Yes, sir.

MR. STRAND: Mr. Examiner, I move admission of Exhibits One through Eleven.

MR. STAMETS: These exhibits will be admitted.

DIRECT EXAMINATION

BY MR. STAMETS:

Q. Mr. Nokes, on Exhibit Ten, CORE Lab identifies that zone as Strawn. Is in fact the interval surveyed within that formation which you all have identified as Atoka-Morrow?

A. Okay. I'm sorry, you mentioned that they called it the Strawn.

Q. Yes.

A. Okay, that was what Texas Oil and Gas, I conversed with them on this topic, it's a matter of nomenclature to them. At the time they could not -- they have a new production head so they cannot indicate, you know, whose -- you know, whose decision it was to call it Strawn or what, but they are in total agreement that it is, you know, an Atoka and that it is a consistent pay that we revealed.

MR. STAMETS: Are there any other questions of the witness?

MR. STOGNER: Yes, Mr. Stamets, I have some.

QUESTIONS BY MR. STOGNER:

Q. Are you aware of any more core samples taken out of this formation in this area?

A. In this area this is the only one from the CORE Labs that I was able to get in contact with in this Atoka-Morrow formation.

There are other core analyses but not in this zone.

Q. Did I hear you correctly that you had investigated all or have information on all seventeen DST's out of this area?

A. Yes, sir, they're indicated on these cross sections.

Q. But you only give us two and these two are in Section 2 and 11 in Township 29 South, Range 29 East.

A. Okay. Let me qualify that statement. To do an engineering study of a DST you have to have complete information of shut-in times, flowing times, and pressures of the DST's.

At this point all of the information that Texas Oil and Gas gave me, only two of the wells were conclusive to be able to run this evaluation. That's why I was very anxious to be able to get a bottom -- a build-up, bottom hole pressure build-up from Stevens, to have another

way of analyzing this information.

Out of this area this, the Texas Oil and Gas wells is the most productive, or looks to be the most productive area, and that was the reason that we used, or that I calculated off of the wells that I did.

MR. STOGNER: No further questions.

MR. STAMETS: Any other questions of the witness? He may be excused.

Anything further in this case?

MR. STRAND: Nothing further, Mr. Examiner.

MR. STAMETS: The case will be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7492 heard by me on 3-16 1982

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

United States Department of the Interior

OFFICE OF THE SECRETARY

Minerals Management Service
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

APR 21 1982

Mr. W. Perry Pearce
Oil Conservation Division
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Pearce:

This jurisdictional agency concurs in the recommendation of the State of New Mexico, Case No. 7492, Order No. R-6934, dated April 9, 1982, that the Atoka-Morrow Formation underlying the described lands in subject order in Chaves County, New Mexico, be designated as a Section 107 tight formation.

It is requested that this concurrence be included with the recommendation submitted to the Federal Energy Regulatory Commission.

Sincerely yours,

James W. Shelton

for Gene F. Daniel
Deputy Minerals Manager
Oil and Gas

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
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SANTA FE, NEW MEXICO 87501
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April 8, 1982

Mr. Robert H. Strand
Attorney at Law
P. O. Box 2226
Roswell, New Mexico 88201

Re: CASE NO. 7492
ORDER NO. R-6934

Applicant:

Harvey E. Yates Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 7492
Order No. R-6934

APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, CHAVES COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on March 16, 1982, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 9th day of April, 1982, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Harvey E. Yates Company, requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 C.F.R. §271.701-705 recommend to the Federal Energy Regulatory Commission that the Atoka-Morrow formation underlying certain lands situated in Chaves County, New Mexico, as described on Exhibit "A" attached to this order, hereinafter referred to as the Atoka-Morrow formation, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations.

(3) That the Atoka-Morrow formation underlies all of the lands described in Exhibit "A"; that the formation consists of shales interspersed with lime and sand sections; that the top of such formation is found at an average depth of 8,100 feet below the surface of said area; and that the thickness of such formation is from 91 to 895 feet within said area.

(4) That the type section for the Atoka-Morrow formation for the proposed tight formation designation is found at a depth of from approximately 8,510 feet to 8,800 feet on the Compensated Neutron Density log dated October 4, 1977, from the Texas Oil and Gas Company B Well No. 1 located in Unit N of Section 2, Township 9 South, Range 29 East, Chaves County, New Mexico.

(5) That the following wells produce or have produced natural gas from the Atoka-Morrow formation within the proposed area:

Texas Oil & Gas Company O'Brien B #1	660 feet from South line and 1980 feet from West line of Section 2, Township 9 South, Range 29 East, NMPM, Chaves County, New Mexico.
Texas Oil & Gas Company O'Brien C #1	1980 feet from South line and 1980 feet from West line of Section 11, Township 9 South, Range 29 East, NMPM, Chaves County, New Mexico.
Texas Oil & Gas Company O'Brien A #1	660 feet from North line and 1980 feet from East line of Section 14, Township 9 South, Range 29 East, NMPM, Chaves County, New Mexico.
Texas Oil & Gas Company O'Brien #1	1980 feet from South line and 660 feet from East line of Section 11, Township 9 South, Range 29 East, NMPM, Chaves County, New Mexico.
Amoco Production Company State JA #1	1980 feet from North line and 1980 feet from West line of Section 36, Township 8 South, Range 29 East, NMPM, Chaves County, New Mexico.
General American Oil Company of Texas GAO State #1	2206 feet from North line and 660 feet from East line of Section 36, Township 7 South, Range 28 East, NMPM, Chaves County, New Mexico.
Stevens Operating Corporation O'Brien C #4	1980 feet from South line and 745 feet from West line of Section 1, Township 9 South, Range 28 East, NMPM, Chaves County, New Mexico.

(6) That the Atoka-Morrow formation underlying the above described lands has been penetrated by several other wells,

none of which produced natural gas in commercial quantities from said formation.

(7) That the evidence presented in this case demonstrated that no well formerly or currently completed in the Atoka-Morrow formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, without stimulation, against atmospheric pressure, as found in the table set out in 18 C.F.R. §271.703(c)(2)(B) of the regulations; and

(c) production of more than five barrels of crude oil per day.

(8) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average in situ gas permeability throughout the pay section of the Atoka-Morrow formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells completed for production in the Atoka-Morrow formation, without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 C.F.R. §271.703 (c)(2)(B) of the regulations; and

(c) No well drilled into the formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

(9) That within the proposed area there is a recognized water aquifer, being the Triassic Sands, found at depths of from 100 feet to 400 feet.

(10) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure

that development of the Atoka-Morrow formation will not adversely affect said water zones.

(11) That the Atoka-Morrow formation, or any portion thereof, as described herein, is not currently being developed by infill drilling as defined in 18 C.F.R. §271.703(b)(6) of the regulations.

(12) That the Atoka-Morrow formation within the proposed area should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 106 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.703 of the regulations that the Atoka-Morrow formation underlying certain lands in Chaves County, New Mexico, as shown on Exhibit "A" attached to this order, be designated as a tight formation.

(2) That jurisdiction of this cause is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

SEAL

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

fd/

TOWNSHIP 7 SOUTH, RANGE 28 EAST, NMPM
Sections 22 through 27: All
Sections 34 through 36: All

TOWNSHIP 7 SOUTH, RANGE 29 EAST, NMPM
Sections 19 through 36: All

TOWNSHIP 7 SOUTH, RANGE 30 EAST, NMPM
Sections 19 through 36: All

TOWNSHIP 7 SOUTH, RANGE 31 EAST, NMPM
Sections 19 through 21: All
Sections 28 through 33: All

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Sections 1 through 3: All
Sections 10 through 15: All
Sections 22 through 27: All
Sections 34 through 36: All

TOWNSHIP 8 SOUTH, RANGE 29 EAST, NMPM
Sections 1 through 36: All

TOWNSHIP 8 SOUTH, RANGE 30 EAST, NMPM
Sections 1 through 36: All

TOWNSHIP 8 SOUTH, RANGE 31 EAST, NMPM
Sections 4 through 9: All
Sections 16 through 21: All
Sections 28 through 33: All

TOWNSHIP 9 SOUTH, RANGE 28 EAST, NMPM
Sections 1 through 3: All
Sections 10 through 15: All

TOWNSHIP 9 SOUTH, RANGE 29 EAST, NMPM
Sections 1 through 18: All

TOWNSHIP 9 SOUTH, RANGE 30 EAST, NMPM
Sections 1 through 18: All

TOWNSHIP 9 SOUTH, RANGE 31 EAST, NMPM
Sections 4 through 9: All
Sections 16 through 18: All

Containing 138,240 acres, more or less.

Exhibit "A"
Order No. R-6934

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
17 February 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Harvey E. Yates Company for designation of a tight formation, Chaves County, New Mexico. CASE 7492

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Robert H. Strand, Esq.
HARVEY E. YATES CO.
Roswell, New Mexico 88201

MR. STAMETS: We'll call Case 7492.

MR. PEARCE: Application of Harvey E. Yates Company for designation of tight formation, Chaves County, New Mexico.

MR. STRAND: Mr. Examiner, we would request that be continued until the March 16th hearing.

MR. STAMETS: Case 7492 will be continued to the March 16th Examiner Hearing.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

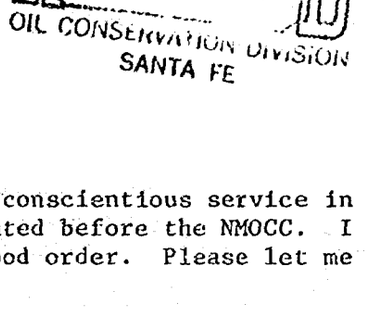
I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7492 heard by me on 2-17 1982.

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

TEXAS OIL & GAS CORP.
600 WILCO BUILDING
MIDLAND, TEXAS 79701

April 14, 1982



Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear People;

Thank you very much for your conscientious service in regards to sending us hearing exhibits presented before the NMOCC. I believe everything has been returned in good order. Please let me know if there is any problem.

Sincerely,

Geof Meyer

GM/lb
Enclosures

KELLAHIN AND KELLAHIN
Attorneys at Law
El Patio - 117 North Guadalupe
Post Office Box 2265
Santa Fe, New Mexico 87501

Telephone 982-4285
Area Code 505

Jason Kellahin
W. Thomas Kellahin

Karen Aubrey
James B. Grant

November 5, 1982

Mr. Joe Rault
RAULT PETROLEUM CORPORATION
1111 Gravier
New Orleans, LA 70112

Re: Tight Sands Designation

Dear Mr. Rault:

In accordance with our telephone conversation yesterday, please find enclosed a complete set of the application, order, transcript and exhibits used in Case 7492, Division Order R-6934.

These documents are on loan to me from the Division and I must return them within ten days. You are free to make whatever copies you desire and then return the originals to me.

Very truly yours,

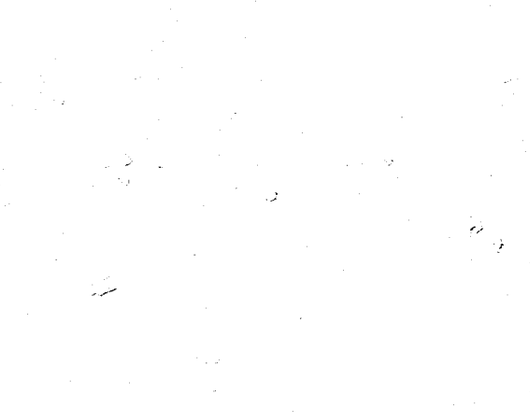
W. Thomas Kellahin

WTK:rb
Enc.
cc: Mr. Jim Vidrine

NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING

DOCKET NO. _____



PREPARED BY:

Harvey E. Yates Company
Suite 300
Security National Bank Building
Roswell, New Mexico 88201

TABLE OF CONTENTS

ATOKA-MORROW TIGHT GAS SAND POOL

The purpose of this report is to present evidence which will demonstrate that the Atoka-Morrow Gas Reservoir under the Sections described in the Tight Formation Application of February 22nd, 1982, in Townships 7, 8 and 9 of Ranges 29, 30 and 31, N.M.P.M., Chaves County, New Mexico, qualifies as a "Tight Formation" area.

The gas permeability in the Atoka-Morrow zone of the Texas Oil and Gas Well O'Brien "B" #1 in Section 2 and O'Brien "C" #1 in Section 11, Township 9 South, Range 29 East, were calculated from drill stem tests. The analysis revealed an in-situ gas permeability ranging from .0022 to .081 millidarcies and is not expected to exceed 0.1 millidarcies.

The stabilized production rate, at atmospheric pressure, for the Atoka-Morrow formation is not expected to be greater than 231 MCFGPD without stimulation and would not exceed the maximum allowable production set out by F.E.R.C.

During the Drill Stem Tests in the O'Brien "B" #1 and the O'Brien "C" #1, there was no evidence of liquid hydrocarbon production. Oil production is not expected to exceed five barrels of crude oil per day in naturally completed wells from the Atoka-Morrow formation in this area.

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 1, 1982

ATOKA-MORROW TIGHT GAS SAND POOL
Chaves County, New Mexico
Data Summary Sheet and Calculations
Prepared by Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 1, 1982

Owner-Operator	Texas Oil & Gas	Texas Oil & Gas
Lease Name	O'Brien "B"	O'Brien "C"
Well Number	Well #1	Well #1
Location: Section, Township, Range	Sec. 2, T-9-S, R-29-E	Sec. 11, T-9-S, R-29-E
Productive Interval	8542-8690' (OA)	8632-8952' (OA)
Test Data:	DST	DST
Date of Test	October 4, 1977	July 16, 1977
Standard Pressure	15.025 psia	15.025 psia
Choke Size	1/4"	1/4"
Production Data:		
Gas Production Rate on Test - MCF	100	120
Condensate - Barrels	None	None
Water Production - Barrels	None	None
Cumulative Gas Production During Test - MCF	N.R.	N.R.
Formation, Reservoir and Physical Characteristics Data:		
Atoka-Morrow Zone Thickness - Feet (h)	59	114
Porosity (Ø)	7.5	8.05
Interstitial Water (Sw) % of Pore Space	24	24
Reservoir Temp °F/°R	160/620	141/601
Specific Gravity of Gas (SG) Air = 1.00	.689	.743
Gas Viscosity (μ_g) @ Reservoir Conditions Cp	.0195	.0231
Reservoir Boundary from Build-up (Pe)-psia	3206.025	3290.025
Critical Pressure P_c - psia	668	665
Critical Temperature T_c -°R	380	403
Pseudo Reduced Pressure-Pr	4.8	4.95
Pseudo Reduced Temperature- Tr	1.79	1.49
Gas Compressibility Factor (Z)	.903	.805
Gas Formation Volume Factor (B_g)-CF/SCF	.00504	.00425

Well Bore Radius (R_w) - feet	.328	.328
Equivalent Liquid Rate of Test Gas Production (Q_{RBPD})	89.84	90.91
Shut in Time of Reservoir Build-up Test - ΔT-minutes	119	180
Slope of Buildup Curve (Horner Technique)(M)psi/cycle	59	1390
Permeability $K = \frac{(162.6)(Qrbpd)(\mu)}{(h)(m)}$	.081	.0022
Gas Compressibility - Cg-psia	2.69×10^{-4}	2.18×10^{-4}
Water Compressibility Cw-psia	2.9×10^{-6}	3.0×10^{-6}
Formation Compressibility Cf - psia	5.4×10^{-6}	5.3×10^{-6}
Total Compressibility Ct - psia	2.1×10^{-4}	1.7×10^{-4}

$(Sq)(Cq)+(Sw)(Cs) + Cf = Ct$

Radius of Investigation During Buildup

$$RI = \sqrt{\frac{KT}{57600\ (\emptyset)(\mu)(Ct)}} = \text{Feet}$$

23.3	4.62

Where T is shut in time in minutes = ΔT (Van Poolen Equation)

Calculated Flow Rate to Atmospheric Pressure in MCFGPD (based on Ri) 231	19.1

Using Darcy Radial Flow Equation

$$gsc = \frac{.703\ Kh\ (Pe^2 - Psc^2)^N}{\mu TZ \cdot \ln\ (re/rw)}$$

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 1, 1982

ATOKA-MORROW TIGHT GAS SAND POOL

Operator:	Texas Oil & Gas	Texas Oil & Gas
Lease Name & Well No.:	O'Brien "B" #1	O'Brien "C" #1
Perforation Interval:	8542-8690'	8632-8952'
Atoka-Morrow Sand:	59'	114'
Rw (Corrected):	.08 ohm	.08 ohm
Ave Porosity - (Ø):	7.5%	8.05%
Ave Resistivity (RT):	230 ohms	193 ohms
Ave Water Saturation (Sw):	24%	24%

Equation used to calculate Sw:

Humble Equation

$$Sw = \sqrt{\frac{\frac{.62}{\emptyset^{2.15}} Rw}{RT}}$$

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 1, 1982

WELL HISTORIES

Operator:	Texas Oil & Gas	Texas Oil & Gas
Lease Name:	O'Brien "B"	O'Brien "C"
Well Numbers:	Well #1	Well #1
Legal Location:	N, 660 FSL & 1980 FWL Sec. 2, T-9-S, R-29-E Chaves County, New Mexico	K, 1980 FWL & 1980 FSL Sec. 11, T-9-S, R-29-E, Chaves County, New Mexico
Spud Date:	September 19, 1977	June 19, 1977
Completion Date:	November 19, 1977	November 19, 1977
Elevation:	3980.8' GR	3978.8' GR
Total Depth:	8930'	9030'
Plug Back Total Depth:	8822'	8980'
Production Interval:	8542-8690' (OA)	8632-8952' (OA)
Casing Summary:	12-3/4' to 315' w/300SXS 8-5/8' to 2615' w/300SXS 4-1/2' to 8930' w/500SXS	12-3/4' to 315' w/300 SXS 8-5/8' to 2615' w/300 SXS 4-1/2' to 9030' w/430 SXS
Treatment Summary:	A/6700 gal 15% NEA	A/13,500 gal 15% NEA
Date of 1st Production:	November 14, 1977	November 15, 1977
Date of Potential Test:	November 14, 1977	November 15, 1977
Length of Test:	4 hours (to air)	4 hours (to air)
Production During Test MCF/BO/BW	39.2/0/0	40.2/0/0
Rate of Test (Stimulated Production)	289 MCFGPD	340 MCFGPD

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 1, 1982

NEW MEXICO OIL CONSERVATION COMMISSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [X] Initial [ ] Annual [ ] Special		Test Date: 11-15-77	
Company: Texas Oil & Gas Corporation	Connection: To Air		
Pool: Undesignated	Formation: Strawn		Unit: K
Completion Date: 11-19-77	Total Depth: 9030'	Plug Back TD: 8980'	Elevation: 3929.8 GR	Farm or Lease Name: O'Brien "C"
Csg. Size: 4 1/2" / Wt.: 10.5 & 11.6 / I.D.: 4.00 / Set At: 9030'	Perforations: From 8632 To 8952			Well No.: 1
Tbg. Size: 2 3/8 / Wt.: 4.7 / I.D.: 1.995 / Set At: 8571	Perforations: From To			Unit: K / Sec.: 11 / Twp.: 9S / Rge.: 29E
Type Well – Single – Bradenhead – G.C. or G.O. Multiple: Single		Packer Set At: 8571		County: Chaves
Producing Thru: Tubing	Reservoir Temp. °F: 166 @ 8542	Mean Annual Temp. °F	Baro. Press. – P_a: 13.2	State: New Mexico
L: 8632 / H: 8632	Gg: .743	% CO_2	% N_2	% H_2S	Prover: Critical Flow	Meter Run	Taps

FLOW DATA					TUBING DATA		CASING DATA		
NO.	Prover Line Size	X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI						1990	71			
1.	2"	x 1/16"	1892		55	1892	69			1 Hr.
2.	2"	x 3/32"	1522		56	1522	60			1 Hr.
3.	2"	x 1/8"	943		57	943	57			1 Hr.
4.	2"	x 3/16"	154		67	154	52			1 Hr.
5.										

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	0.06405		1905.2	1.005	1.160	1.293	184
2.	0.1410		1535.2	1.004	1.160	1.273	321
3.	0.2648		956.2	1.003	1.160	1.154	340
4.	0.6082		167.2	0.9933	1.160	1.022	120
5.							

NO.	P_r	Temp. °R	T_r	Z
1.	2.86	515	1.27	.598
2.	2.30	516	1.27	.617
3.	1.43	517	1.28	.751
4.	.25	517	1.28	.958
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons None Produced Deg.
Specific Gravity Separator Gas .743 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX .743
Critical Pressure 667 P.S.I.A. 667 P.S.I.A.
Critical Temperature 405 R 405 R

P_f 2645.2 P_f^2 6997

NO	P_t^2	P_s	P_s^2	$P_c^2 - P_w^2$
1		2567.2	6591	406
2		2429.2	5901	1096
3		2293.2	5259	1738
4		2107.2	4440	2557
5				

$AOF = Q\left[\frac{P_f^2}{P_f^2 - P_s^2}\right]^n$ $= 17.234$ $\left[\frac{P_f^2}{P_f^2 - P_s^2}\right]^{.75}$ $= 4.151$

$AOF = Q\left[\frac{P_f}{P_f - P_s^2}\right]^n = 764$

Absolute Open Flow 764 Mcfd @ 15.025 | Angle of Slope θ 63.5° | Slope, n .500

Remarks: Bottom Hole Pressure Recorded with Amerada RPG-3
Instrument No. 41379 (0-6000 psi Range)

Approved by Commission: | Conducted By: | Calculated By: | Checked By:

NEW MEXICO OIL CONSERVATION COMMISSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [X] Initial [ ] Annual [ ]		Test Date: 11-14-77	
Company: Texas Oil & Gas Corporation	Connection: To Air		
Pool: Undesignated	Formation: Strawn		Unit: N
Completion Date: 11-19-77	Total Depth: 8930'	Plug Back TD: 8822'	Elevation: 3980.8	Farm or Lease Name: O'Brien "B"
Csg. Size: 4 1/2"	Wt.: 11.6 & 10.5	d: 4.00	Set At: 8930	Perforations: From 8542 To 8690	Well No.: 1
Tbg. Size: 2 3/8"	Wt.: 4.7	d: 1.995	Set At: 8311	Perforations: From To	Unit: N Sec.: 2 Twp.: 9S Rge.: 29E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single			Packer Set At: 8311	County: Chaves
Producing Thru: Tubing	Reservoir Temp. °F: 166 @ 8542	Mean Annual Temp. °F	Baro. Press. – P_a: 13.2	State: New Mexico
L: 8542	H: 8542	Gg: .689	% CO_2	% N_2	% H_2S	Prover: Critical Flow	Meter Run	Taps

FLOW DATA / TUBING DATA / CASING DATA

NO.	Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Tubing Press. p.s.i.g.	Tubing Temp. °F	Casing Press. p.s.i.g.	Casing Temp. °F	Duration of Flow
SI							2151	67			
1.	2"	x	1/16"	1833		56	1833	66			1 Hr.
2.	2"	x	3/32"	1362		59	1362	64			1 Hr.
3.	2"	x	1/8"	812		62	812	61			1 Hr.
4.	2"	x	3/16"	251		64	251	60			1 Hr.
5.											

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor F_t	Gravity Factor F_g	Supercompress. Factor, F_{pv}	Rate of Flow Q, Mcfd
1	0.06405		1846.2	1.004	1.205	1.235	177
2.	0.1410		1375.2	1.001	1.205	1.181	276
3.	0.2648		825.2	0.9981	1.205	1.101	289
4.	0.6082		264.2	0.9962	1.205	1.030	199
5.							

NO.	P_t	Temp. °R	T_r	Z
1.	2.760	516	1.33	.656
2.	2.056	519	1.34	.717
3.	1.233	522	1.35	.825
4.	.395	524	1.35	.943
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons: None Produced Deg.
Specific Gravity Separator Gas: .689 XXXXXXXXX
Specific Gravity Flowing Gas: XXXXX .689
Critical Pressure: 669 P.S.I.A. 669 P.S.I.A.
Critical Temperature: 388 R 388 R

P_c 2967.2 P_c^2 8775

NO	P_t^2	P_s	P_s^2	$P_f^2 - P_s^2$
1		2690.2	7237	1538
2		2116.2	4478	4297
3		1508.2	2275	6500
4		927.2	860	7915
5				

(1) $\frac{P_c^2}{P_f^2 - P_s^2} = 5.705$ (2) $\left[\frac{P_f^2}{P_f^2 - P_s^2}\right]^n = 2.389$

AOF = $Q\left[\frac{P_f^2}{P_f^2 - P_s^2}\right]^n$ = 423

Absolute Open Flow 423 Mcfd @ 15.025 Angle of Slope θ 63.5° Slope, n .500

Remarks: Buttom Hole Pressure Recorded with Amerada RPG-3 Instrument No. 41379 (0-6000 psi Range)

Approved By Commission: | Conducted By: | Calculated By: | Checked By:

Permeability Calculations for the

TEXAS OIL & GAS

O'Brien "A" #1

Sec 14, T-9S, R-29E

Chaves County, New Mexico

Maximum Permeability	90° to Plug	S_w%	Description
8722-23' .5	.4	19.6	SD V/F
8723-24.6' <.1	<.1	26.8	SD
8724.6-26' 203	<.1	46.1	SD shy V/F

Ave Core Perm: (1) excluding large fracture .24 md. Ave: S_w 30.8

(2) with the fracture 34 md.

Overburden Pressure Calculations:

P_{ob} = 1.0964 psi/ft

$P_{ob_{res}}$ = (1.0964)(8723') = 9564 psi @ reservoir conditions

$P_{ob_{res}} - \rho_w$ = psi net confining pressure.

9564 - 3212 = 6352 psi net confining pressure.

Using permeability S_w and the nomograph from the P_{ob} paper it is possible to calculate corrected reservoir permeabilities.

Example: No fracture to slightly fractured -

Nomograph Figure #1 @ 6352 psi = 8% of initial permeability of matrix.
Nomograph Figures #5 & #6 averaged for 30% S_w @ 6352 psi = 47% of initial permeability.

Therefore (.08)(.47)(.24 md) = .00902 md for non-fractured to slightly fractured interval.

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
Roswell, New Mexico 88201

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 10
CASE NO. 7492
Submitted by Applicant
Hearing Date 3/16/82

3001 COMMERCE DRIVE BOX 4237, MIDLAND, TEXAS 79701 915-684-3581

CORE LABORATORIES, INC.

September 12, 1977

Texas Oil & Gas Corporation
900 Wilco Building
Midland, Texas 79701

File : 3102-10428
Subject: Core Analysis
O'Brien A No. 1
Wildcat
Chaves County, New Mexico

Gentlemen:

The subject well was cored using diamond coring equipment and fresh water to obtain 4.25 inch diameter cores from 8690 to 8747 feet from the Strawn formation.

Permeable formation between 8722 to 8726 feet is considered to be gas productive; however due to the low productive and storage capacity an economic completion is considered to be very doubtful.

Core analysis data is presented in tabular and graphical form for your convenience. A procedural page is also included with other pertinent data.

We trust these data will be useful in the evaluation of your property and thank you for the opportunity or serving you.

Very truly yours,

CORE LABORATORIES, INC.

Jack H. Neff

Jack H. Neff
Laboratory Supervisor

JHN/rlb/jg

Texas Oil & Gas Corporation
O' Brien A No. 1
File: 3102-10428
Procedural Page

The cores were preserved at the wellsite in a CO_2 atmosphere and transported to Midland by Core Laboratories, Inc. personnel.

A Core Gamma Log was recorded for downhole E-log correlation.

Core analysis was made from intervals requested on whole-core diameter samples.

Fluid removal and fluid saturations were determined using controlled temperature vacuum retort techniques.

Porpsity was determined using whole-core summation of fluids.

Air permeability measured in two horizontal directions.

The core was boxed.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

TEXAS OIL & GAS CORPORATION
O' BRIEN A NO. 1
WILDCAT
CHAVES COUNTY, NEW MEXICO

DATE: 8-23-7[illegible]
FORMATION: STRAWN
DRLG. FLUID: FRESH WATER
LOCATION: 1980 FEL 660 FNL SEC 14 T-9-S R29E

FILE NO: 3102-[illegible]428
ENGINEER: DILLARD
ELEVATION: 402 DF

* INDICATES PLUG PERM S INDICATES PRESERVED SAMPLE

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
			WHOLE CORE ANALYSIS						
	8690.0-92.5 LM SHY								
	8692.5-94.0 SD LMY SHY								
	8694.5-8700.5 SH SL/LMY								
	8700.5-02.0 LM SHY								
	8702.0-07.0 SH LMY								
	8707.0-09. LM SL/SHY								
	8709.0-10.5 SH SL/SDY								
	8710.5-2[illegible].0 SD SL/SHY								
1	872[illegible].0-23.0	0.5	0.4		7.6	2.0	19.6		SD V/F
2	8723.0-24.6	<0.1	<0.1		3.2	1.9	26.8		SD
3	8724.6-26.0	203.0	<0.1		1.4	6.1	46.1		SD SHY V/F
	8726.0-27.5 SH SL/SDY								
	8727.5-31.4 SH SL/LMY								
	8731.4-38.6 LM SHY								

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

TEXAS OIL & GAS CORPORATION
O' BRIEN A NO. 1

DATE: 8-23-7
FORMATION: STRAWN

FILE NO: 3102-1047-8
ENGINEER: OIL ARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMU	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
	8738.5-47.0 SH BDY								

ATOKA - MORROW TIGHT GAS SAND POOL
Chaves County, New Mexico
Data Summary Sheet and Calculations
Prepared by Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 4, 1982

Owner-Operator	Stevens Operating Corporation
Lease Name	O'Brien "C"
Well Number	Well #1
Location: Section, Township Range	Sec. 1, T-9S, R-28E
Production Interval	6831-6834' (OA)
Test Data:	Bottom Hole Pressure Build-up & Multipoint Back Pressure Test
Date of Test	July 8 - 10, 1981
Standard Pressure	15.025 psia

Production Data:

Average Gas Production Rate during Test - MCFGPD	351.5
Condensate - Barrels/MCF	.0488
Gravity of Condensate @ 60° F	65.5°
Water Production - Barrels	None
Cumulative Gas Production during Test - MCFG	58.58

Formation, Reservoir and Physical Characteristic Data:

Atoka - Morrow Zone Thickness - Feet (h)	26
Average Porosity (Ø)	6.5%
Interstitial Water (S_w) % of Pore Space - Est.	22%
Reservoir Temperature °F/°R	120/580
Specific Gravity of Gas (SG) Air = 1.00	.7216
Gas Viscosity (μg) @ Reservoir Conditions Cp	.0206
Reservoir Boundary from Build-up (Pe) psia	2815.025
Critical Pressure (P_c) psia	687
Critical Temperature (T_c) °R	389
Pseudo-Reduced Pressure (P_r)	4.10
Pseudo-Reduced Temperature (T_r)	1.49
Gas Compressibility Factor (Z)	.78
Gas Formation Volume Factor (B_g) CF/SCF	.00464

$$B_g = \frac{(P_{sc})(T^{\circ}R)(Z)}{(^{\circ}R_{sc})(Pe)}$$

Average Equivalent Liquid Rate of Test Gas Production (Q_{RBPD}) — 290.46

$$Q_{RBPD} = \frac{(Q_{scf})(B_g)}{5.615}$$

Slope of Build-up Curve (Horner Technique) (M) psi/cycle — 1000

Permeability — .0374 md

$$K = \frac{(162.6)(Q_{RPBD})(\mu)}{(M)(h)} = \text{md}$$

Well Bore Radius (R_w) - feet — .328

Shut in Time of Reservoir Build-up Test - ΔT in minutes — 2910

Gas Compressibility C_g - psia = 3.05×10^{-4}

Water Compressibility C_w - psia = 2.9×10^{-6}

Formation Compressiblity C_f - psia = 5.8×10^{-6}

Total Compressiblity C_t - psia = 2.4×10^{-4}

$$(S_g)(C_g) + (S_w)(C_w) + C_f = C_t$$

Radius of Investigation During Build-up

$$RI = \sqrt{\frac{KT}{(57600)(\emptyset)(\mu)(C_t)}} = \text{feet}$$ — 76.69

Where T is the Shut-in Time in minutes ΔT (Van Poolen Equation)

Calculated Flow Rate to Atmospheric Pressure in MCFGPD

(Using Darcy Radial Flow Equation)

$$qsc = \frac{.703\ K_h\ (P_e^2 - P_{sc}^2)^N}{\mu T Z \cdot \ln (re/rw)}$$ — 37.96

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 4, 1982

WELL HISTORY

Operator:	Stevens Operating Corporation
Lease Name:	O'Brien "C"
Well Number:	Well #4
Legal Location:	L, 1980' FSL & 745' FWL Sec. 1, T-9S, R-28E Chaves County, New Mexico
Spud Date:	February 12, 1975
Completion Date:	July 14, 1981
Elevation:	3938' GL; 3950' KB
Total Depth:	7235'
PBTD:	7000'
Production Interval:	6831-6834' (OA)
Casing Summary:	8-5/8" to 1970' w/870 sx 5-1/2" to 7235' w/700 sx
Treatment Summary:	A/35 bbls (1470 gals) 7-1/2% acid w/1000 SCF N2 & 16 bbls 2% KCL Frac/20,000 gal gelled KCL & 18,500# 20/40 sd.
Date of First Production:	N/R (SI, WOPL)
Date of Potential Test:	July 24, 1981
Length of Test:	4 hours
Production During Test: MCF/BO/BW	58.58 MCFG
Rate of Test (Ave.): Stimulated Production	351.5 MCFGPD

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 4, 1982

Steven's Operating Corporation

Horner Technique Calculations
from Pressure Build-up

$\frac{T+\Delta T}{\Delta T}$	Pressure
1.17	1026
.90	1301
.75	1543
.65	1743
.58	1876
.52	2000
.48	2130
.44	2203
.38	2345
.33	2449
.39	2510
.27	2554
.23	2594
.20	2623
.18	2641
.16	2658
.14	2670
.13	2681
.11	2701
.09	2722
.07	2742
.06	2757
.05	2768
.04	2774
.04	2783
.03	2788
.03	2794

M = 1000 psig/cycle

P_e = 2800 psig

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 4, 1982

BEFORE THE OIL CONSERVATION DIVISION

ENERGY AND MINERALS DEPARTMENT

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION CHAVES COUNTY, NEW MEXICO : Case No. _____

APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states:

1. Applicant is the owner of an interest in the Atoka-Morrow Formation underlying the following described lands situated in Chaves County, New Mexico:

Township 7 South, Range 28 East, NMPM
Sections: 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 7 South, Range 29 East, NMPM
Sections: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 28 East, NMPM
Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 8 South, Range 29 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 28 East, NMPM
Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15

Township 9 South, Range 29 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Township 7 South, Range 30 East, NMPM
Sections: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 30 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 30 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Township 7 South, Range 31 East, NMPM
Sections: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 31 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 31 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Containing a total of 161,280 acres, more or less.

2. The Atoka-Morrow formation underlying the above described lands is expected to have an estimated average *in situ* gas permeability throughout the pay section of less than 0.1 millidarcy.

3. The stabilized production rate, against atmospheric pressure of wells completed for pdocution in said formation, without stimulation, is not expected to exceed the production levels set out in 18 C.F.R. §271.703(c)(2)(B).

4. No well drilled into said formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

WHEREFORE, applicant prays:

A. That this application be set for hearing before an examiner, and that notice of said hearing be given as required by law.

B. That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, the Atoka-Morrow formation underlying the above described lands be designated a tight formation.

C. For such further relief as the Division deems just and proper.

DATED this 22nd day of February, 1982.

HARVEY E. YATES COMPANY

By: _____

Robert H. Strand
Attorney for Applicant
P.O. Box 2226
Roswell, New Mexico 88202-2226

RHS/bjt

Dockets Nos. 9-82 and 10-82 are tentatively set for March 31, and April 14, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - TUESDAY - MARCH 16, 1982

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

ALLOWABLE: (1) Consideration of the allowable production of gas for April, 1982, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for April, 1982, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

CASE 7502: Application of Sun Oil Company for an unorthodox gas well location and non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 760 feet from the South line and 960 feet from the East line of Section 6, Township 24 South, Range 37 East, Jalmat Gas Pool, and a 160-acre non-standard proration unit comprising the SE/4 of said Section 6.

CASE 7503: Application of Sun Oil Company for an unorthodox gas well location and non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 1980 feet from the North line and 1400 feet from the East line of Section 22, Township 22 South, Range 36 East, Jalmat Gas Pool, and a 120-acre non-standard proration unit comprising the W/2 NE/4 and SE/4 NE/4 of said Section 22.

CASE 7504: Application of Cities Service Company for the extension of vertical limits of the Langlie Mattix Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the contraction of the vertical limits of the Jalmat Pool and the upward extension of the vertical limits of the Langlie Mattix Pool to a subsurface depth of 3416 feet underlying the NW/4 of Section 19, Township 24 South, Range 37 East.

CASE 7505: Application of BCO, Inc. for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Lybrook-Gallup and Basin-Dakota production in the wellbores of wells drilled and to be drilled in Section 2, 3, 4, 9 and 10, Township 23 North, Range 7 West.

CASE 7506: Application of Getty Oil Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of salt water into the Abo formation in the perforated interval from 8900 feet to 9300 feet in its State "P" Well No. 1, located in Unit P, Section 32, Township 16 South, Range 37 East, Lovington-Abo Pool.

CASE 7507: Application of Sonny's Oilfield Service, Inc. for an oil treating plant permit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at a site in the NW/4 NE/4 of Section 29, Township 18 South, Range 38 East.

CASE 7508: Application of P & O Oilfield Services, Inc. for an oil treating plant permit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at a site in the SW/4 NE/4 of Section 10, Township 25 South, Range 36 East.

CASE 7459: (Continued from February 17, 1982, Examiner Hearing)

Application of Red Mountain Associates for the Amendment of Order No. R-6538, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-6538, which authorized applicant to conduct waterflood operations in the Chaco Wash-Mesa Verde Oil Pool. Applicant seeks approval for the injection of water through various other wells than those originally approved, seeks deletion of the requirement for packers in injection wells, and seeks an increase in the previously authorized 68-pound limitation on injection pressure.

CASE 7457: (Continued from February 17, 1982, Examiner Hearing)
(This Case will be continued to April 28, 1982)

Application of E. T. Ross for nine non-standard gas proration units, Harding County, New Mexico. Applicant, in the above-styled cause, seeks approval for nine 40-acre non-standard gas proration units in the Bravo Dome Carbon Dioxide Area. In Township 19 North, Range 30 East: Section 12, the NW/4 NW/4 and NE/4 NW/4; Section 14, the NW/4 NE/4, SW/4 NE/4, and SE/4 NE/4. In Township 20 North, Range 30 East: Section 11, the NE/4 SW/4, SW/4 SE/4, SE/4 SW/4, and NW/4 SE/4.

CASE 7509: Application of Supron Energy Corporation for a non-standard proration unit or compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 160-acre non-standard proration unit for the Dakota and Mesaverde formations comprising the SW/4 of Section 2, Township 21 North, Range 8 West, or in the alternative, an order pooling all mineral interests from the surface down through the Dakota formation underlying the S/2 of said Section 2, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7510: Application of Union Oil Company of California for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp and Penn formations underlying the N/2 of Section 10, Township 22 South, Range 32 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7511: (This Case will be continued to March 31, 1982)
Application of Buffton Oil & Gas Inc. for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp through Devonian formations underlying the W/2 of Section 35, Township 16 South, Range 35 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7496: (Continued from March 3, 1982, Examiner Hearing)

Application of Viking Petroleum, Inc. for an unorthodox location, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of an Abo gas well to be drilled 62 feet from the South line and 1984 feet from the East line of Section 29, Township 5 South, Range 24 East, the SE/4 of said Section to be dedicated to the well.

CASE 7512: Application of Viking Petroleum, Inc. for an unorthodox location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well located in Unit H of Section 31, Township 13 South, Range 34 East, Nonombre-Penn Pool, said well being a recompleted Morrow test and located in the SE/4 of the quarter section whereas the pool rules require wells to be located in the NE/4 or SW/4 of the quarter section.

CASE 7476: (Continued from March 3, 1982, Examiner Hearing)

Application of Jack J. Grynberg for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Abo formation, underlying two 160-acre gas spacing units, being the NE/4 and SE/4, respectively, of Section 12, Township 5 South, Range 24 East, each to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells.

CASE 7513: Application of Mesa Petroleum Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Abo formation underlying the SE/4 of Section 12, Township 5 South, Range 24 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7514: Application of Santa Fe Exploration Co. for compulsory pooling, or in the alternative a non-standard proration unit, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Permo-Penn, Strawn, Atoka and Morrow formations underlying the W/2 of Section 2, Township 20 South, Range 25 East to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a 200 percent charge for risk involved in drilling said well. In the event said 200 percent risk factor is not approved, applicant seeks a non-standard unit excluding the lands of owners not participating in the well.

CASE 7515: Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Dakota formation underlying all or portions of Townships 26 and 27 North, Ranges 12, and 13 West, Township 29 North, Ranges 13 through 15 West, and Township 30 North, Ranges 14 and 15 West, containing 164,120 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7445: (Continued from February 17, 1982, Examiner Hearing)
(This Case will be continued to April 28, 1982)

Application of Harvey E. Yates Company for an NGPA determination, Eddy County, New Mexico. Applicant, in theabove-styled cause, seeks a new onshore reservoir determination in the San Andres formation for its Fulton Collier Well No. 1 in Unit G of Section 1, Township 18 South, Range 28 East.

CASE 7492: (Continued and Readvertised)

Application of Harvey E. Yates Company for a tight formation, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Atoka-Morrow formation underlying all or portions of Townships 7, 8, and 9 South, Ranges 28, 29, 30 and 31 East, containing 161,280 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7500: (Continued from March 3, 1982, Examiner Hearing)

Application of Read & Stevens, Inc. for an exception to the maximum allowable base price provisions of the New Mexico Natural Gas Pricing Act, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order of the Division prescribing the price allowed for production enhancement gas under Section 107 of the Natural Gas Policy Act as the maximum allowable base price if production enhancement work which qualifies under the NGPA is performed on its Hackberry Hills Unit Well No. 4 located in Section 22, Township 22 South, Range 26 East, Eddy County, New Mexico.

Docket No. 6-82

Dockets Nos. 7-82 and 8-82 are tentatively set for March 3 and March 17, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 17, 1982

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

ALLOWABLE: (1) Consideration of the allowable production of gas for March, 1982, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for March, 1982, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

(3) Consideration of purchaser's nominations for the one year period beginning April 1, 1982, for both of the above areas.

CASE 7445: (Continued from December 16, 1981, Examiner Hearing)
(THIS CASE WILL BE CONTINUED TO THE EXAMINER HEARING ON MARCH 17, 1982)

Application of Harvey E. Yates Company for an NGPA determination, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir determination in the San Andres formation for its Fulton Collier Well No. 1 in Unit G of Section 1, Township 18 South, Range 28 East.

CASE 7479: Application of Northwest Pipeline Corporation for amendment of Order No. R-2046, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the Amendment of Division Order No. R-2046, which authorized approval of six non-standard proration units, Basin-Dakota Gas Pool.

The amendment sought is for the creation of the following non-standard proration units to be drilled at standard locations thereon: Township 31 North, Range 6 West, Section 25: N/2 (272.16 acres) and S/2 (273.3 acres); Section 36: N/2 (272.56 acres) and S/2 (272.88 acres); Township 30 North, Range 6 West; Section 1: N/2 (272.81 acres) and S/2 (273.49 acres).

CASE 7480: Application of Arco Oil & Gas Company for pool creation, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Upper Devonian gas pool for its Custer Well No. 1 located 1810 feet from the North line and 2164 feet from the West line of Section 6, Township 25 South, Range 37 East, Custer Field.

CASE 7481: Application of Arco Oil & Gas Company for amendment of Order No. R-6792, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Division Order No. R-6792, which authorized the directional drilling of applicant's Custer Wells Well No. 1 to an unorthodox location in the Devonian and Ellenburger formations and imposed a penalty in the Devonian. By stipulation applicant and the offset operator have agreed that the subject well is not affecting the offsetting property and applicant herein seeks removal of the penalty imposed for so long as the well produces only from the present perforated interval in the Upper Devonian.

CASE 7459: (Continued from January 20, 1982, Examiner Hearing)

Application of Red Mountain Associates for the Amendment of Order No. R-6538, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-6538, which authorized applicant to conduct waterflood operations in the Chaco Wash-Mesa Verde Oil Pool. Applicant seeks approval for the injection of water through various other wells than those originally approved, seeks deletion of the requirement for packers in injection wells, and seeks an increase in the previously authorized 68-pound limitation on injection pressure.

CASE 7410: (Continued from January 20, 1982, Examiner Hearing)

Application of B.O.A. Oil & Gas Company for two unorthodox oil well locations, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 2035 feet from the South line and 2455 feet from the East line and one to be drilled 2455 feet from the North line and 1944 feet from the East line, both in Section 31, Township 31 North, Range 15 West, Verde-Gallup Oil Pool, the NW/4 SE/4 and SW/4 NE/4, respectively, of said Section 31 to be dedicated to said wells.

CASE 7457: (Continued from January 20, 1982, Examiner Hearing)

Application of E. T. Ross for nine non-standard gas proration units, Harding County, New Mexico. Applicant, in the above-styled cause, seeks approval for nine 40-acre non-standard gas proration units in the Bravo Dome Carbon Dioxide Area. In Township 19 North, Range 30 East: Section 12, the NW/4 NW/4 and NE/4 NW/4; Section 14, the NW/4 NE/4, SW/4 NE/4, and SE/4 NE/4. In Township 20 North, Range 30 East: Section 11, the NE/4 SW/4, SW/4 SE/4, SE/4 SW/4, and NW/4 SE/4.

CASE 7482: Application of Wiser Oil Company for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 1295 feet from the South line and 1345 feet from the West line of Section 32, Township 21 South, Range 37 East, Penrose-Skelly Pool.

CASE 7483: Application of Adams Exploration Company for salt water disposal, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from 4176 feet to 4293 feet in its Griffin Well No. 4 located in Unit A, of Section 10, Township 8 South, Range 32 East, Chaveroo-San Andres Pool.

CASE 7462: (Continued from February 3, 1982, Examiner Hearing)

Application of Marathon Oil Company for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of the Drinkard and Blinebry production in the wellbore of its C. J. Saunders Well No. 3, located in Unit C of Section 1, Township 22 South, Range 36 East.

CASE 7474: (Continued from February 3, 1982, Examiner Hearing)

Application of Union Oil Company of California for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Strawn, Atoka and Morrow formations underlying the E/2 of Section 25, Township 19 South, Range 33 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7484: Application of Anadarko Production Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Atoka and Morrow formations underlying the E/2 of Section 1, Township 19 South, Range 25 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the the well, and a charge for risk involved in drilling said well.

CASE 7485: Application of Berge Exploration for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Abo formation underlying two 160-acre proration units, the first being the NW/4 and the second being the SW/4 of Section 27, Township 7 South, Range 26 East, each to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells.

CASE 7486: Application of MGF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Abo formation underlying the NE/4 NE/4 of Section 6, Township 20 South, Range 39 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7487: Application of MGF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Abo formation underlying the SE/4 SE/4 of Section 31, Township 19 South, Range 39 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

(b) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Devonian production and designated as the North King-Devonian Pool. The discovery well is Samedan Oil Corporation Speight Well No. 1 located in Unit B of Section 3, Township 13 South, Range 37 East, NMPM. Said pool would comprise:

TOWNSHIP 13 SOUTH, RANGE 37 EAST, NMPM
Section 3: NE/4

(c) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Atoka production and designated as the North Loving-Atoka Gas Pool. The discovery well is Gulf Oil Corporation Eddy GR State Well No. 1 located in Unit E of Section 16, Township 23 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 23 SOUTH, RANGE 27 EAST, NMPM
Section 12: N/2

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 4: S/2
Section 7: All
Section 8: All
Section 9: All
Section 16: All
Section 17: All
Section 18: E/2

(d) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Drinkard production and designated as the Teague-Drinkard Pool. The discovery well is Alpha Twenty-One Production Company Lea Well No. 1 located in Unit B of Section 17, Township 23 South, Range 37 East, NMPM. Said pool would comprise:

TOWNSHIP 23 SOUTH, RANGE 37 EAST, NMPM
Section 17: NE/4

(e) EXTEND the West Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 23: All
Section 24: W/2

(f) EXTEND the Atoka-Pennsylvanian Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 26 EAST, NMPM
Section 16: W/2

(g) EXTEND the Avalon-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 26 EAST, NMPM
Section 2: Lots 1 through 8

(h) EXTEND the Brunson-Fusselman Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 5: SE/4

(i) EXTEND the Brushy Draw-Delaware Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 26 SOUTH, RANGE 29 EAST, NMPM
Section 26: E/2

(j) EXTEND the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 15 SOUTH, RANGE 27 EAST, NMPM
Section 23: All
Section 26: All

EXAMINER HEARING - WEDNESDAY - FEBRUARY 17, 1982

CASE 7488: Application of Burkhart Petroleum Company for compulsory pooling, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the SW/4 NW/4 of Section 13, Township 8 South, Range 37 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7073: (Reopened and Readvertised)

In the matter of Case 7073 being reopened pursuant to the provisions of Order No. R-6558, which order promulgated special rules for the South Elkins-Fusselman Pool in Chaves County including provisions for 80-acre spacing units and a limiting gas-oil ratio of 3000 to one. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units with a limiting gas-oil ratio of 2000 to one.

CASE 7074: (Reopened and Readvertised)

In the matter of Case 7074 being reopened pursuant to the provisions of Orders Nos. R-6565 and R-6565-B, which created the South Elkins-Fusselman Gas Pool in Chaves County. All interested parties may appear and present evidence as to the exact nature of the reservoir, and more particularly, as to the proper rate of withdrawal from the reservoir if it is determined that said pool is producing from a retrograde gas condensate reservoir.

CASE 6373: (Reopened and Readvertised)

In the matter of Case 6373 being reopened pursuant to the provisions of Orders Nos. R-5875 and R-5875-A, which created the East High Hope - Abo Gas pool in Eddy County, and promulgated special rules therefor, including a provision for 320-acre spacing units. All interested parties may appear and show cause why said pool should not be developed on 160-acre spacing units.

CASE 7489: Application of Curtis J. Little for designation of a tight formation, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Chacra formation underlying portions of Township 25 North, Range 6 West, containing 6,720 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705.

CASE 7490: Application of Harvey E. Yates Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Atoka-Morrow formation, underlying the N/2 of Section 19, Township 8 South, Range 30 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7491: Application of Harvey E. Yates Company for designation of a tight formation, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Atoka formation underlying portions of Townships 12, 13, and 14 South, Ranges 35 and 36 East, containing 46,720 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705, said area being an eastward and westward extension of previously approved tight formation area.

CASE 7492: Application of Harvey E. Yates Company for designation of a tight formation, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Atoka-Morrow formation underlying all or portions of Townships 7, 8, and 9 South, Ranges 29,30, and 31 East, containing 115,200 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705.

CASE 7493: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating and extending certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico.

(a) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the East Bootleg Ridge-Morrow Gas Pool. The discovery well is Getty Oil Company Getty 15 Federal Well No. 1 located in Unit J of Section 15, Township 22 South, Range 33 East, NMPM. Said Pool would comprise:

TOWNSHIP 22 SOUTH, RANGE 33 EAST, NMPM
Section 15: S/2

(k) EXTEND the Cary-Montoya Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 4: W/2 SW/4
Section 5: SE/4
Section 9: W/2 W/2

(l) EXTEND the Crow Flats-Morrow Gas Pool in Eddy County, New Mexico to include therein:

TOWNSHIP 16 SOUTH, RANGE 27 EAST, NMPM
Section 35: E/2
Section 36: W/2

(m) EXTEND the South Culebra Bluff-Bone Spring Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 25: S/2 SW/4
Section 27: SW/4

(n) EXTEND the Elkins-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 28 EAST, NMPM
Section 21: NE/4

(o) EXTEND the Empire-Abo Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM
Section 19: S/2 SW/4

(p) EXTEND the Henshaw-Queen Grayburg-San Andres Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM
Section 19: NE/4 NW/4

(q) EXTEND the Indian Flats-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 28 EAST, NMPM
Section 26: W/2

(r) EXTEND the West Nadine-Blinebry Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 38 EAST, NMPM
Section 8: NW/4

(s) EXTEND the Peterson-Mississippian Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 4 SOUTH, RANGE 33 EAST, NMPM
Section 28: NW/4

(t) EXTEND the Race Track-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 28 EAST, NMPM
Section 7: S/2 SW/4
Section 18: NW/4 and N/2 SW/4 and SW/4 SW/4

(u) EXTEND the Railroad Mountain-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 2: NE/4 and E/2 NW/4

(v) EXTEND the Red Lake-Queen-Grayburg-San Andres Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 7: S/2
Section 8: SW/4
Section 18: E/2 NW/4

(w) EXTEND THE West Sawyer-San Andres Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 37 EAST, NMPM
Section 5: SW/4

(x) EXTEND the Turkey Track-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 29 EAST, NMPM
Section 15: All

(y) EXTEND the Twin Lakes-San Andres Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 13: SE/4
Section 24: NE/4

TOWNSHIP 9 SOUTH, RANGE 28 EAST, NMPM
Section 12: S/2 NE/4

TOWNSHIP 9 SOUTH, RANGE 29 EAST, NMPM
Section 7: S/2
Section 8: NW/4

Robert H. Strand, P.A.
Attorney at Law

Practice Limited to Oil and Gas Law

Telephone (505) 624-0251
Suite 124 - Petroleum Building
Roswell, New Mexico 88201
Please Reply To: P.O. Box 2541

March 29, 1982

Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

ATTN: Mr. Perry Pearce

Re: Case No. 7492
Application for Designation of Tight Formation
Chaves County, New Mexico

Gentlemen:

Enclosed are two copies of the transcripts in the above referenced case, and a proposed Order for your consideration.

Yours truly,

Robert H. Strand

RHS/bjt
encls
xc: Harvey E. Yates Company
Minerals Management Service

Well Bore Radius (R_w) - feet	.328	.328
Equivalent Liquid Rate of Test Gas Production (Q_{RBPD})	89.84	90.91
Shut in Time of Reservoir Build-up Test - ΔT-minutes	119	180
Slope of Buildup Curve (Horner Technique)(M)psi/cycle	59	1390
Permeability $K = \frac{(162.6)(Qrbpd)(\mu)}{(h)(m)}$	.081	.0022
Gas Compressibility - Cg-psia	2.69×10^{-4}	2.18×10^{-4}
Water Compressibility Cw-psia	2.9×10^{-6}	3.0×10^{-6}
Formation Compressibility Cf - psia	5.4×10^{-6}	5.3×10^{-6}
Total Compressibility Ct - psia	2.1×10^{-4}	1.7×10^{-4}

$(Sg)(Cg)+(Sw)(Cw) + Cf = Ct$

Radius of Investigation During Buildup

$$RI = \sqrt{\frac{KT}{57600\ (\emptyset)(\mu)(Ct)}} = \text{Feet}$$

23.3	4.62

Where T is shut in time in minutes = ΔT (Van Poolen Equation)

Calculated Flow Rate to Atmospheric Pressure in MCFGPD (based on Ri) 231	19.1

Using Darcy Radial Flow Equation

$$qsc = \frac{.703\ Kh\ (Pe^2 - Psc^2)^N}{\mu T z \cdot \ln\ (re/rw)}$$

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
March 1, 1982

Robert H. Strand, P.A.

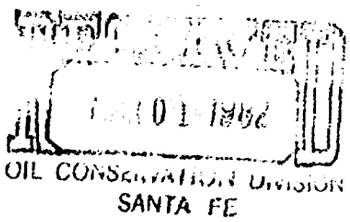
Attorney at Law

Practice Limited to Oil and Gas Law

Telephone (505) 624-0251
Suite 124 - Petroleum Building
Roswell, New Mexico 88201

Please Reply To: P.O. Box 2541

March 1, 1982



Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

ATTN: Mr. Perry Pearce

Re: Exhibits
Atoka-Morrow Tight Formation
Chaves County, New Mexico

Case 7492

Dear Perry:

As we discussed by telephone this morning, enclosed are the Exhibits we plan to present at the hearing on the above referenced matter scheduled for March 16, 1982.

If you have any questions, please let me know.

Yours truly,

Robert H. Strand

RHS/bjt
encls

Robert H. Strand, P.A.

Attorney at Law

Practice Limited to Oil and Gas Law

Telephone (505) 624-0251
Suite 124 · Petroleum Building
Roswell, New Mexico 88201
Please Reply To: P.O. Box 2226

February 22, 1982

Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

ATTN: Mr. Richard Stamets

Re: Application of Harvey E. Yates
Designation of Tight Formation
Chaves County, New Mexico

Dear Mr. Stamets:

Enclosed for filing is an original and two copies of the Application of Harvey E. Yates Company in the above referenced matter. This case has previously been set for hearing on the March 16, 1982 Docket.

Sincerely yours,

Robert H. Strand

RHS/bj
encls

BEFORE THE OIL CONSERVATION DIVISION

ENERGY AND MINERALS DEPARTMENT

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION :
OF HARVEY E. YATES COMPANY FOR : Case No. _____
DESIGNATION OF A TIGHT FORMATION :
CHAVES COUNTY, NEW MEXICO :

APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states:

1. Applicant is the owner of an interest in the Atoka-Morrow Formation underlying the following described lands situated in Chaves County, New Mexico:

Township 7 South, Range 28 East, NMPM
Sections: 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 7 South, Range 29 East, NMPM
Sections: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 28 East, NMPM
Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 8 South, Range 29 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 28 East, NMPM
Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15

Township 9 South, Range 29 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Township 7 South, Range 30 East, NMPM
Sections: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 30 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 30 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Township 7 South, Range 31 East, NMPM
Sections: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 31 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 31 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Containing a total of 151,280 acres, more or less.

2. The Atoka-Morrow formation underlying the above described lands is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy.

3. The stabilized production rate, against atmospheric pressure of wells completed for pdocution in said formation, without stimulation, is not expected to exceed the production levels set out in 18 C.F.R. §271.703(c)(2)(B).

4. No well drilled into said formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

WHEREFORE, applicant prays:

A. That this application be set for hearing before an examiner, and that notice of said hearing be given as required by law.

B. That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, the Atoka-Morrow formation underlying the above described lands be designated a tight formation.

C. For such further relief as the Division deems just and proper.

DATED this 22nd day of February, 1982.

HARVEY E. YATES COMPANY

By: Robert H. Strand

Robert H. Strand
Attorney for Applicant
P.O. Box 2226
Roswell, New Mexico 88202-2226

RHS/bjt

Robert H. Strand, P.A.

Attorney at Law

Practice Limited to Oil and Gas Law

Telephone (505) 624-0251
Suite 124 - Petroleum Building
Roswell, New Mexico 88201

Please Reply To: P.O. Box 2226

January 27, 1982

Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

ATTN: Mr. Richard Stamets

Re: Application of Harvey E. Yates
Designation of Tight Formation
Chaves County, New Mexico

Case 7492

Dear Mr. Stamets:

Enclosed for filing is an original and two copies of the Application of Harvey E. Yates Company in the above referenced matter. This case has previously been set for hearing on the February 17, 1982 Docket.

Sincerely yours,

Robert H. Strand

RHS/bjt
encls

BEFORE THE OIL CONSERVATION DIVISION

ENERGY AND MINERALS DEPARTMENT

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION :
OF HARVEY E. YATES COMPANY FOR : Case No. 7492
DESIGNATION OF A TIGHT FORMATION :
CHAVES COUNTY, NEW MEXICO :

APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states;

1. Applicant is the owner of an interest in the Atoka-Morrow Formation underlying the following described lands situated in Chaves County, New Mexico:

Township 7 South, Range 29 East, NMPM
Sections 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 8 South, Range 29 East, NMPM
Sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 9 South, Range 29 East, NMPM
Sections 1, 2, 3, 10, 11, 12, 13, 14, 15

Township 7 South, Range 30 East, NMPM
Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 30 East, NMPM
Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 30 East, NMPM
Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Township 7 South, Range 31 East, NMPM
Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 31 East, NMPM
Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,
11, 12, 13, 14, 15, 16, 17, 18, 19,
20, 21, 22, 23, 24, 25, 26, 27, 28,
29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 31 East, NMPM
Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,
11, 12, 13, 14, 15, 16, 17, 18

Containing a total of 115, 200 acres, more or less.

2. The Atoka-Morrow formation underlying the above described lands is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy.

3. The stabilized production rate, against atmospheric pressure of wells completed for production in said formation, without stimulation, is not expected to exceed the production levels set out in 18 C.F.R. §271.703 (c)(2)(B).

4. No well drilled into said formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

WHEREFORE, applicant prays:

A. That this application be set for hearing before an examiner, and that notice of said hearing be given as required by law.

B. That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, the Atoka-Morrow formation underlying the above described lands be designated a tight formation.

C. For such further relief as the Division deems just and proper.

DATED this 27th day of January, 1982.

HARVEY E. YATES COMPANY

By: Robert H. Strand

Robert H. Strand
Attorney for Applicant
P.O. Box 2226
Roswell, New Mexico 88202-2226

RHS/bjt

Memo

From

61,280 acres

FLORENE DAVIDSON
ADMINISTRATIVE SECRETARY

To Called in by Bob Brand
2/22/82

Case 7492
Amended description of lands
Chaves County

✓T 7S, R 28E - Sections 22 thru 36
✓T 7S, R 29E - Sections 19 thru 36
✓T 7S, R 31 E - Sections 19 thru 36
✓T 8S, R 28E - Sections 1 thru 3, 10 thru 15, 22 thru 27, 34 thru 36
✓T 8S, R 29E - Sections 1 thru 36
✓T 8S, R 30E - Sections 1 thru 36
✓T 8S, R 31E - Sections 1 thru 36
✓T 9S, R 28E - Sections 1 thru 3, 10 thru 15
✓T 9S, R 29E - Sections 1 thru 36

OIL CONSERVATION COMMISSION-SANTA FE

✓T 9S, R 30E - Sections 1 thru 13
✓T 9S, R 31E - Sections 1 thru 18

Memo

From

FLORENE DAVIDSON
ADMINISTRATIVE SECRETARY

To February 12, 1952

Called in by Bob Strand
2/11/52

Harvey E. Yates Company
Designation of Gas Formation
Atoka - Morrow Chaves

T 7S, R 29E 115,200 acres
S 22-27, 34-36
T 8S, R 29E
S 1-3, 10-15, 22-27, 34-36

T 9S, R 29E
S 1-3, 10-15

T 7S, R 30E
S 19-36

T 8S, R 30E
S 1-36

T 9S, R 30E
S 1-18

T 7S, R 31E
S 19-36

T 8S, R 31E
S 1-36

T 9S, R 31E
S 1-18

OIL CONSERVATION COMMISSION-SANTA FE

Township 8 South, Range 28 East, NMPM
Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 8 South, Range 29 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 28 East, NMPM
Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15

Township 9 South, Range 29 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Township 7 South, Range 30 East, NMPM
Sections: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 30 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 30 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Township 7 South, Range 31 East, NMPM
Sections: 19, 20, 21, 28, 29, 30, 31 32, 33

Township 8 South, Range 31 East, NMPM
Sections: 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33

Township 9 South, Range 31 East, NMPM
Sections: 4, 5, 6, 7, 8, 9, 16, 17, 18

Containing a total of 138, 240 acres, more or less

(3) That the Atoka-Morrow formation underlies all of the ~~above described~~ lands; that the formation consists of shales interspersed with lime and sand sections; that the top of such formation is found at an average depth of 8,100 feet below the surface of the area; ~~not out in Finding No. (2) above~~; and that the thickness of such formation is from 91 to 895 feet within said area.

(4) That the type section for the Atoka-Morrow formation for the proposed tight formation designation is found at a depth of from approximately 8,510 feet to 8,800 feet on the Compensated Neutron Density log dated October 4, 1977, from the Texas Oil and Gas Company B No. 1 Well located in Unit N of Section 2, Township 9 South, Range 29 East, Chaves County, New Mexico.

(5) That the following wells produce or have produced natural gas from the Atoka-Morrow formation within the proposed area:

Texas Oil & Gas Company O'Brien B #1	660 feet from South line and 1980 feet from West line of Section 2, Township 9 South, Range 29 East, N.M.P.M., Chaves County, New Mexico.
Texas Oil & Gas Company O'Brien C #1	1980 feet from West line and 1980 feet from South line of Section 11, Township 9 South, Range 29 East, N.M.P.M., Chaves County, New Mexico.
Texas Oil & Gas Company O'Brien A #1	1980 feet from East line and 660 feet from North line of Section 14, Township 9 South, Range 29 East, N.M.P.M., Chaves County, New Mexico.
Texas Oil & Gas Company O'Brien #1	1980 feet from South line and 660 feet from East line of Section 11, Township 9 South, Range 29 East, N.M.P.M., Chaves County, New Mexico.
Amoco Production Company State JA #1	1980 feet from North line and 1980 feet from West line of Section 36, Township 8 South, Range 29 East, N.M.P.M., Chaves County, New Mexico.
General American Oil Company of Texas GAO State #1	2206 feet from North line and 660 feet from East line of Section 36, Township 7 South, Range 28 East, N.M.P.M., Chaves County, New Mexico.

Stevens Operating Corporation O'Brien C #4	1980 feet from South line and 745 feet from West line of Section 1, Township 9 South, Range 28 East, N.M.P.M., Chaves County, New Mexico.

(6) That the Atoka-Morrow formation underlying the above described lands has been penetrated by several other wells, none of which produced natural gas in commercial quantities from said formation.

(7) That the evidence presented in this case demonstrated that no well formerly or currently completed in the Atoka-Morrow formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, without stimulation, against atmospheric pressure, as found in the table set out in 18 C.F.R. §271.703(c)(2)(B) of the regulations; and

(c) production of more than five barrels of crude oil per day.

(8) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average in situ gas permeability throughout the pay section of the Atoka-Morrow formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells completed for production in the Atoka-Morrow formation, without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 C.F.R. §271.703(c)(2)(B) of the regulations; and

(c) No well drilled into the formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

(9) That within the proposed area there is a recognized water aquifer, being the Triassic Sands, found at depths of from 100 feet to 400 feet.

(10) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Atoka-Morrow foramtion will not adversely affect said water zones.

(11) That the Atoka-Morrow formation, or any portion thereof, as described herein, is not currently being developed by infill drilling as defined in 18 C.F.R. §271.703(b)(6) of the regulations.

(12) That the Atoka-Morrow formation within the proposed area should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 106 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.703 of the regulations that the Atoka-Morrow formation underlying the Certain ~~following described~~ lands in Chaves County, New Mexico, as shown on Exhibit "A" attached to this Order be designated as a tight formation.

Township 7 South, Range 28 East, NMPM
Sections: 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 7 South, Range 29 East, NMPM
Sections: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 8 South, Range 28 East, NMPM
Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 8 South, Range 29 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Township 9 South, Range 28 East, NMPM
Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15

Township 9 South, Range 29 East, NMPM
Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Township 7 South, Range 30 East, NMPM	
Sections:	19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
Township 8 South, Range 30 East, NMPM	
Sections:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
Township 9 South, Range 30 East, NMPM	
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Township 7 South, Range 31 East, NMPM	
Sections:	19, 20, 21, 28, 29, 30, 31, 32, 33
Township 8 South, Range 31 East, NMPM	
Sections:	4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33
Township 9 South, Range 31 East, NMPM	
Sections:	4, 5, 6, 7, 8, 9, 16, 17, 18

Containing a total of 138, 240 acres, more or less.

(2) That jurisdiction of this cause is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove described.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

Township 7 South, Range 28 East, NMPM
Section 22 through 27: All
Section 34 through 36: All

Township 7 South, Range 29 East, NMPM
Section 19 through 36: All

Township 7 South, Range 30 East, NMPM
Section 19 through 36: All

Township 7 South, Range 31 East, NMPM
Section 19 through 21: All
" 28 through 33: All

Township 8 South, Range 28 East, NMPM
Section 1 through 3: All
" 10 " 15: All
" 22 " 27: All
" 34 " 36: All

Township 8 South, Range 29 East, NMPM
Section 1 through 36: All

Township 8 South, Range 30 East, NMPM
Section 1 through 36: All

Township 8 South, Range 31 East, NMPM
Section 4 through 9: All
" 16 " 21: All
" 28 " 33: All

Township 9 South, Range 28 East, NMPM
Section 1 through 3: All
" 10 through 15: All

Township 9 South, Range 29 East, NMPM
Section 1 through 18: All

Township 9 South, Range 30 East, NMPM
Section 1 through 18: All

Township 9 South, Range 31 East, NMPM
Section 4 through 9: All
" 16 " 18: All

Containing 138,240 acres, more or less.

Exhibit "A"
Order No.

CASE 7493: SOUTHEAST NOMENCLATURE FOR FEBRUARY, 1982